National Institute of Environmental Health Sciences

Mainstreaming carbon management in healthcare systems: A bottom-up modeling approach

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Abstract:

Increasing greenhouse gas emissions threaten human health and the environment. In response, healthcare managers face significant challenges in balancing operational decisions about patient care with carbon mitigation targets. We explore a bottom-up modeling framework to aid in the decision-making for both carbon and cost in healthcare, using data from a case study in Cornwall, UK. A model was built and run for secondary healthcare, specifically outpatient clinics, theater lists, beds, and diagnostic facilities. Five scenarios were tested: business-as-usual; service expansion; site closure; water temperature reduction; and theater optimization. The estimated emissions from secondary healthcare in Cornwall ran to 5787 T CO(2)eq with patient travel adding 2215 T CO(2)eq. Closing selected sites would have reduced this by 4% (261 T CO(2)eq), a reduction less than the resulting increases in patient transport emissions. Reducing hot water temperatures by 5 degrees C and improving theater usage would lower the footprint by 0.7% (44 T CO(2)eq) and 0.08% (5 T CO(2)eq), respectively. We consider bottom-up models important tools in the process of estimating and modeling the carbon footprint of healthcare. For the carbon reduction targets of the healthcare sector to be met, the use of these bottom-up models in decision making and forward planning is pivotal.

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Resource Description

Exposure : ☑

weather or climate related pathway by which climate change affects health

Unspecified Exposure

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : United Kingdom

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Medical Community Engagement:

resource focus on how the medical community discusses or acts to address health impacts of climate change

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Mitigation

Model/Methodology:

type of model used or methodology development is a focus of resource

Methodology

Resource Type:

format or standard characteristic of resource

Policy/Opinion, Research Article, Research Article

Timescale:

time period studied

Time Scale Unspecified